APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/613,019	07/07/2003	Eric Morgan Dowling	Modem050-C1	6399

7590 10/25/2006		EXAMINER
Eric M. Dowling		WILLIAMS, LAWRENCE B

ART UNIT	PAPER NUMBER
2611	

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DATE MAILED: 10/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	10/613,019	DOWLING, ERIC MORGAN
	Examiner	Art Unit	
	Lawrence B. Williams	2611	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>2</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 July 2003*.

2a)☐ This action is **FINAL**.   2b)☐ This action is non-final.

3)☒ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-21* is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☒ Claim(s) *1* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Specification

1.   The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

2.   Claim 1 is objected to because of the following informalities:

a.) Claim 1 recites the limitation "wherein the computation of the parameter" in line 15. There is insufficient antecedent basis for this limitation in the claim. The examiner suggests "wherein a computation of the parameter".

b.) The examiner suggests "with the digital representation of the remote-echo cancellation signal" in line 21.

Appropriate correction is required.

Allowable Subject Matter

3.   Claims 1-21 are allowed.

4.   The following is a statement of reasons for the indication of allowable subject matter:

The instant application discloses a subscriber modem apparatus. A search of prior art records has failed to teach or suggest alone or in combination

" a subscriber modem apparatus that couples to an analog subscriber line and is operative to

cooperate with a cooperative modem located across a digital network, the digital network being

coupled to the subscriber line via a network line interface card, the subscriber modem

comprising: a remote-echo canceller coupled to receive a downlink training signal sent by the

cooperative modem and to process the training signal in order to allow at least one parameter to

be adjusted in the remote-echo-canceller, the remote-echo canceller operative to apply the at

least one parameter to a downlink signal to produce a digital representation of a remote-echo

cancellation signal, wherein the remote-echo cancellation signal is computed such that when it

passes through the subscriber line and then combines with an echo signal at the input to an ADC

(analog to digital converter) located within the network line interface card, a remote echo-

cancellation error signal is produced at the input to the ADC in which at least some components

of the echo signal have been substantially reduced, and wherein the computation of the

parameter involves a first set of computations computed at the cooperative modem and a second

set of computations computed in the subscriber modem; a modem transmitter module which

converts a bit stream into a digital representation of a modulated uplink signal; and a combining

unit which combines the digital representation of the modulated uplink signal with the digital

representation remote-echo cancellation signal and couples the combined signal to a DAC

(digital to analog converter) for subsequent coupling as an uplink analog signal onto the

subscriber line to be transmitted to the ADC; whereby the ADC thereby samples a signal

comprising a superposition of the modulated uplink signal, the echo signal and the remote echo

cancellation signal; whereby the superposition of the echo signal and the remote echo

cancellation combine to produce a remote echo cancellation error signal, a measure of which is

reduced with respect to the echo signal" as disclosed in claim 1.

" a subscriber modem apparatus that couples to an analog subscriber line and is operative to cooperate with a cooperative modem located across a digital network, the digital network being coupled to the Subscriber line via a network line interface card, the subscriber modem comprising: a coupling to receive from the subscriber line a downlink training signal sent from the cooperative modem; a digital signal processor operative to execute software functions in order to process a set of signals; a software function operative to convert the downlink training signal into a set of downlink channel parameters which serve to parametrically model a downlink transfer function of a communication path extending from the line interface card to the subscriber modem via the subscriber line; a software function that causes an uplink training signal to be coupled via the subscriber line to the cooperative modem to allow the cooperative modem to model an uplink transfer function; a set of remote echo canceller parameters that are jointly derived using the downlink parameters derived in the subscriber modem and the uplink parameters derived in the cooperative modem; a software function for use during normal data-mode operation, which causes the remote echo canceller to receive a downlink data signal, apply it to a digital filter, and generate a remote echo cancellation signal; a combiner function to combine the remote echo cancellation signal with an uplink modem signal; wherein when the combination of the remote echo cancellation signal and the uplink modem signal traverse the uplink subscriber line transfer path and reach an ADC (analog to digital converter) located in the line interface card, whereby at least a substantial component of a downlink-to-uplink echo as seen at the input to the ADC in the line interface card is substantially reduced" as disclosed in claim 9.

" in a communication system involving a digital modem coupled to a digital network, a line interface card that couples the digital network to a subscriber line, and a subscriber modem coupled to the subscriber line, a method of cooperative training used to converge upon a set of parameters for use within a remote echo canceller located in the subscriber modem, wherein the converged set of parameters are iterated to substantially reduce a measure of an echo cancellation error signal as observed at an ADC (analog to digital converter) located within an uplink path of the line interface card, a method comprising: at the digital modem, transmitting a training signal in a downlink direction to the subscriber modem wherein the training signal passes through the line interface card; at the subscriber modem, receiving the training signal from the subscriber line, digitizing the training signal, and applying the digitized training signal to a remote echo canceller, wherein the remote echo canceller uses a present set of parameters in a parametric model to generate a remote echo cancellation signal, and coupling the remote echo cancellation signal via the subscriber line to the line interface card; at the digital modem, receiving a set of values that correspond to a remote-echo-cancellation-error signal as digitized by the ADC within the line card and transmitted back to the digital modem via the digital network, wherein the remote-echo-cancellation-error signal is developed as a superposition of the downlink training signal and the uplink remote echo cancellation signal; at the digital modem, computing a parameter adjustment to produce a modified set of parameters to be used in the remote echo canceller, wherein the parameter adjustment is estimated to reduce a measure of the remote-echo-cancellation-error signal, and transmitting an indication of the parameter adjustment to the subscriber modem; in the subscriber modem, adjusting the set of parameters used in the remote echo canceller and readying itself to receive a subsequent training signal for a next iteration of

adjustment" as disclosed in claim 17.

Conclusion

5.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a.) Dowling discloses in US Patent 6,597,732 B1 High-Speed Modem With Uplink Remote-Echo Canceller.

b.) Dowling discloses in US Patent 6,522,688 B1 PCM Codec And Modem For 56K Bi-Directional Transmission.

c.) Polley et al. discloses in US Patent 6,618,480 B1 DAC Architecture For Analog Echo Cancellation.

d.) Kaku et al. discloses in US Patent 5,896,420 Transmission Apparatus Having Echo Cancellation Facility.

e.) Fisher discloses in US Patent 4,539,675 Echo Canceller.

6.   This application is in condition for allowance except for the following formal matters:

a.) Claim objections as noted above.

Prosecution on the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

A shortened statutory period for reply to this action is set to expire **TWO MONTHS** from the mailing date of this letter.

7.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Lawrence B Williams whose telephone number is 571-272-3037.

The examiner can normally be reached on Monday-Friday (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Ghayour Mohammad can be reached on 571-272-3021. The fax phone number for

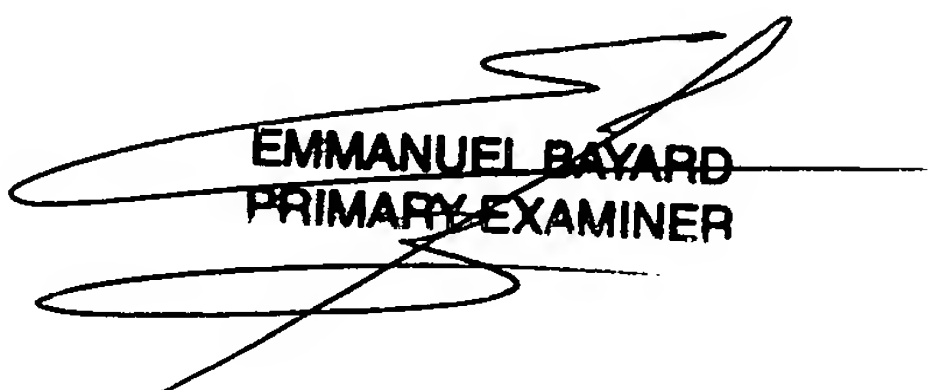the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lawrence B. Williams

lbw
October 11, 2006

EMMANUEL BAYARD
PRIMARY EXAMINER